

"A Hierarchical Cellular Kalman Filter for Oceanic and Atmospheric Data Assimilation"

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A new method is advanced for approximating Kalman filtering and smoothing for oceanic and atmospheric data assimilation. The approach solves the larger estimation problem by dividing it into a series of smaller calculations. Errors with short correlation distance are evaluated by regional approximations and errors associated with quasi-independent processes are evaluated separately from one another. The overall model uncertainty is approximated by the sum of the individual error components. The resulting smaller dimension of each separate component renders application of Kalman filtering and smoothing to the larger problem much more practical than otherwise. The efficacy of the divide-and-conquer approach depends on identifying an efficient means of approximating the large degree-of-freedom dynamical system (ocean and/or atmosphere) by a low-order model. The approach will be described and issues discussed using examples assimilating satellite altimetry observations to ocean models.